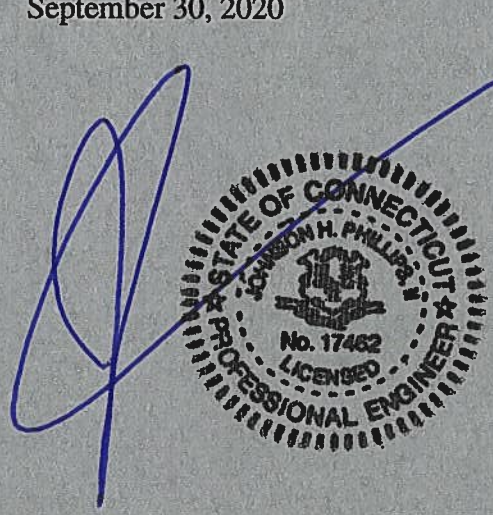
DRAINAGE REPORT

AJ Resources LLC

Winsted Road
Torrington, CT

September 30, 2020



PREPARED BY:

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SUMMARY

The applicant proposes to excavate 100,000 cy of earth materials from their Winsted Road property. The existing site is a steeply sloped woodland with very little soil cover over bedrock. A detention basin is designed to reduce post -development flows to pre-development levels for the 2-yr, 10-yr, 25-yr, 50-yr, and 100-year storms.

The proposed site grading will contain the runoff from the excavation in the excavated area by creating a swale along the west edge of an existing north-south running plateau at the toe of the existing slope.The runoff will be directing to the detention basin located at the southern end of the property. The detention basin will connect to an existing drainage system in Winsted Road. A summary of the watershed analysis is found on the next page. Hydraflow Hydrographs software is used to evaluate the pre- and post- development conditions.

BORGHESI BUILDING & ENGINEERING CO.
2155 EAST MAIN ST., TORRINGTON, CT

AJ Resources LLC
Winsted Road, Torrington, CT

SUMMARY OF DISCHARGES

STORM (YEAR)	EXISTING (CFS)	PROPOSED (CFS)	CHANGE (CFS)
2	4.13	4.02	-0.11
10	9.91	7.46	-2.45
25	13.35	8.67	-4.68
50	16.49	9.65	-6.84
100	20.18	10.59	-9.59

APPENDIX A:

HYDROLOGIC CALCULATIONS: EXISTING CONDITIONS

Watershed Model Schematic

Legend

Hyd.	Origin	Description
1	SCS Runoff	Existing

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	4.131	-------	-------	9.911	13.35	16.49	20.18	Existing

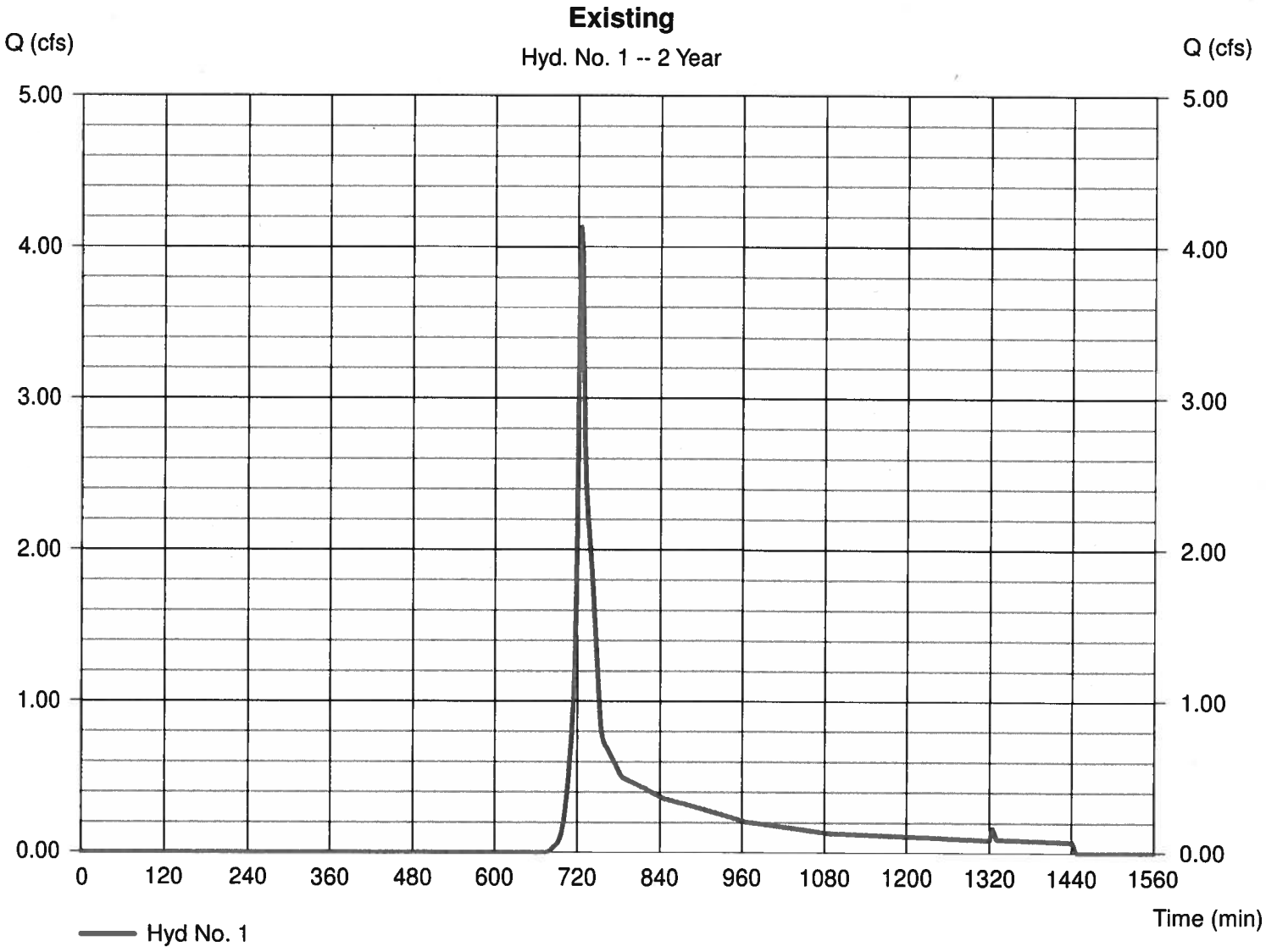
Hydrograph Report

Hyd. No. 1

Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 4.131 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 13,808 cuft
Drainage area	= 4.900 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.30 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (4.900 x 70)] / 4.900



TR55 Tc Worksheet

Hyd. No. 1

Existing

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 50.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 16.00		0.00		0.00		
Travel Time (min)	**= 3.57**	**+**	**0.00**	**+**	**0.00**	**=**	**3.57**
Shallow Concentrated Flow							
Flow length (ft)	= 420.00		0.00		0.00		
Watercourse slope (%)	= 40.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 10.20		0.00		0.00		
Travel Time (min)	**= 0.69**	**+**	**0.00**	**+**	**0.00**	**=**	**0.69**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.030		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 4.30 min

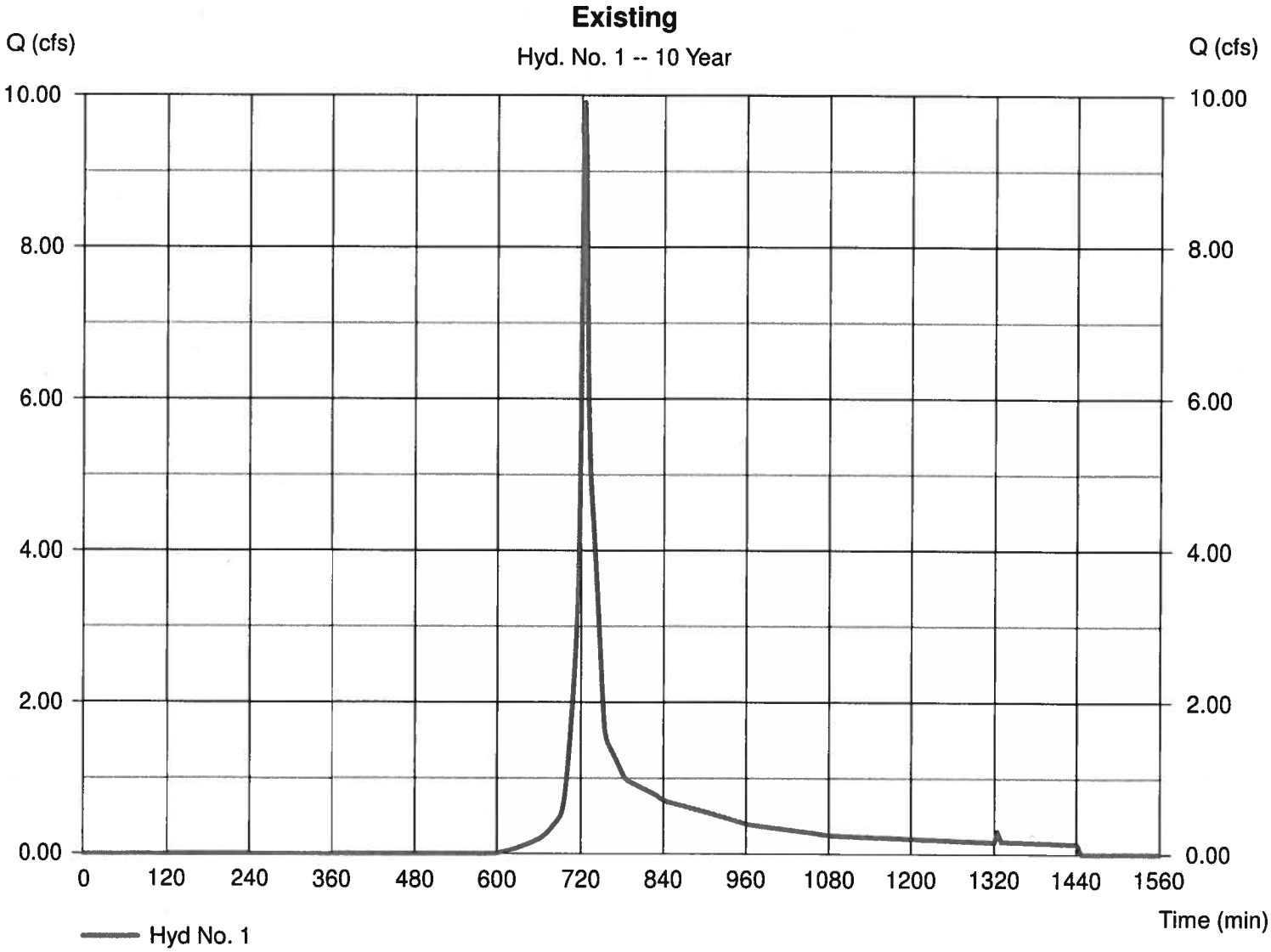
Hydrograph Report

Hyd. No. 1

Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 9.911 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 30,295 cuft
Drainage area	= 4.900 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.30 min
Total precip.	= 4.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (4.900 x 70)] / 4.900



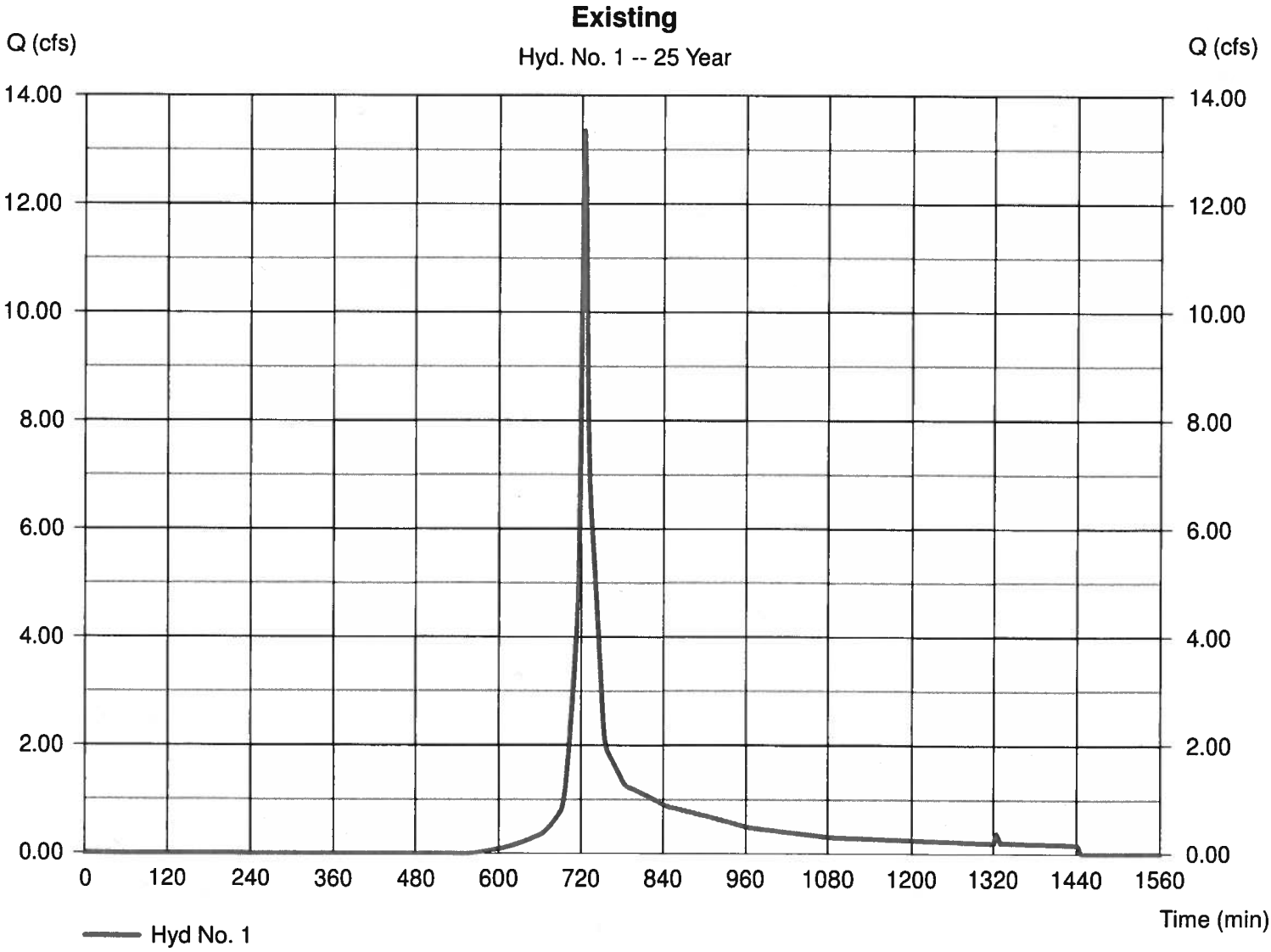
Hydrograph Report

Hyd. No. 1

Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 13.35 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 40,259 cuft
Drainage area	= 4.900 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.30 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (4.900 x 70)] / 4.900



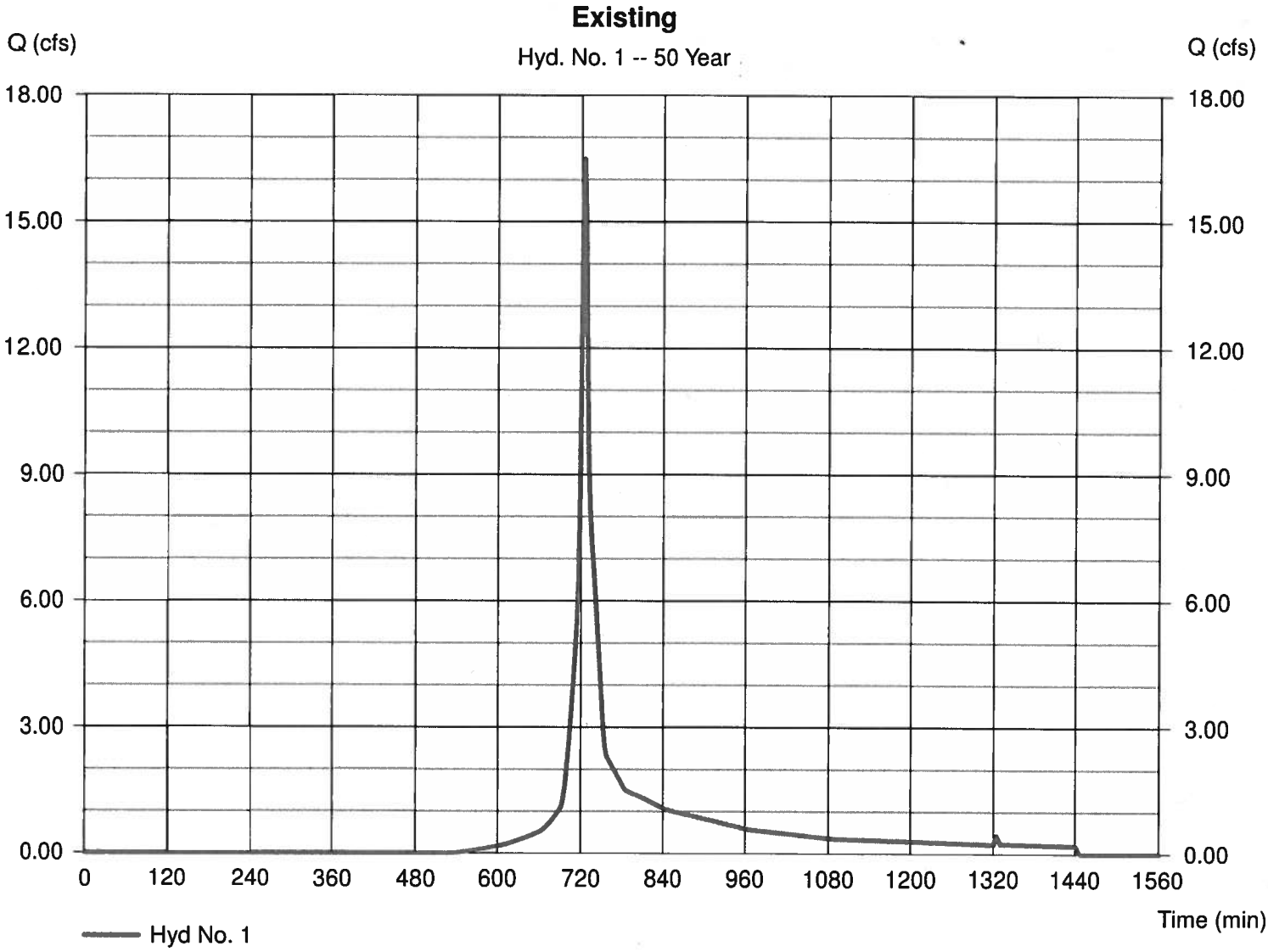
Hydrograph Report

Hyd. No. 1

Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 16.49 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 49,438 cuft
Drainage area	= 4.900 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.30 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (4.900 x 70)] / 4.900



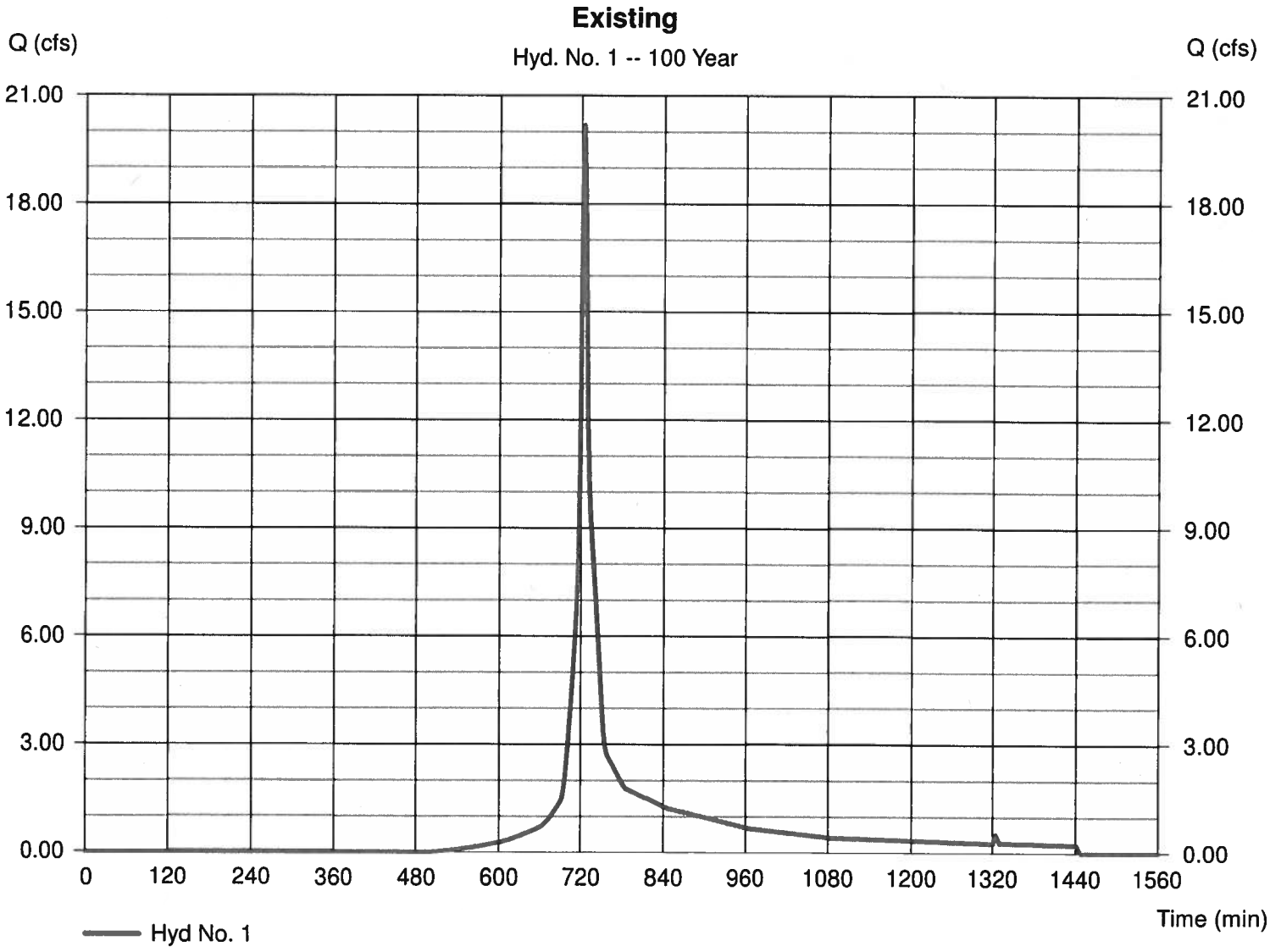
Hydrograph Report

Hyd. No. 1

Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 20.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 60,338 cuft
Drainage area	= 4.900 ac	Curve number	= 70*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 4.30 min
Total precip.	= 7.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = + (4.900 x 70)] / 4.900



APPENDIX B:

HYDROLOGIC CALCULATIONS: PROPOSED CONDITIONS

Watershed Model Schematic

Legend

Hyd.	Origin	Description
1	SCS Runoff	Proposed
2	Reservoir	det

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	8.152	-------	-------	15.17	19.05	22.47	26.40	Proposed
2	Reservoir	1	-------	4.021	-------	-------	7.460	8.672	9.654	10.59	det

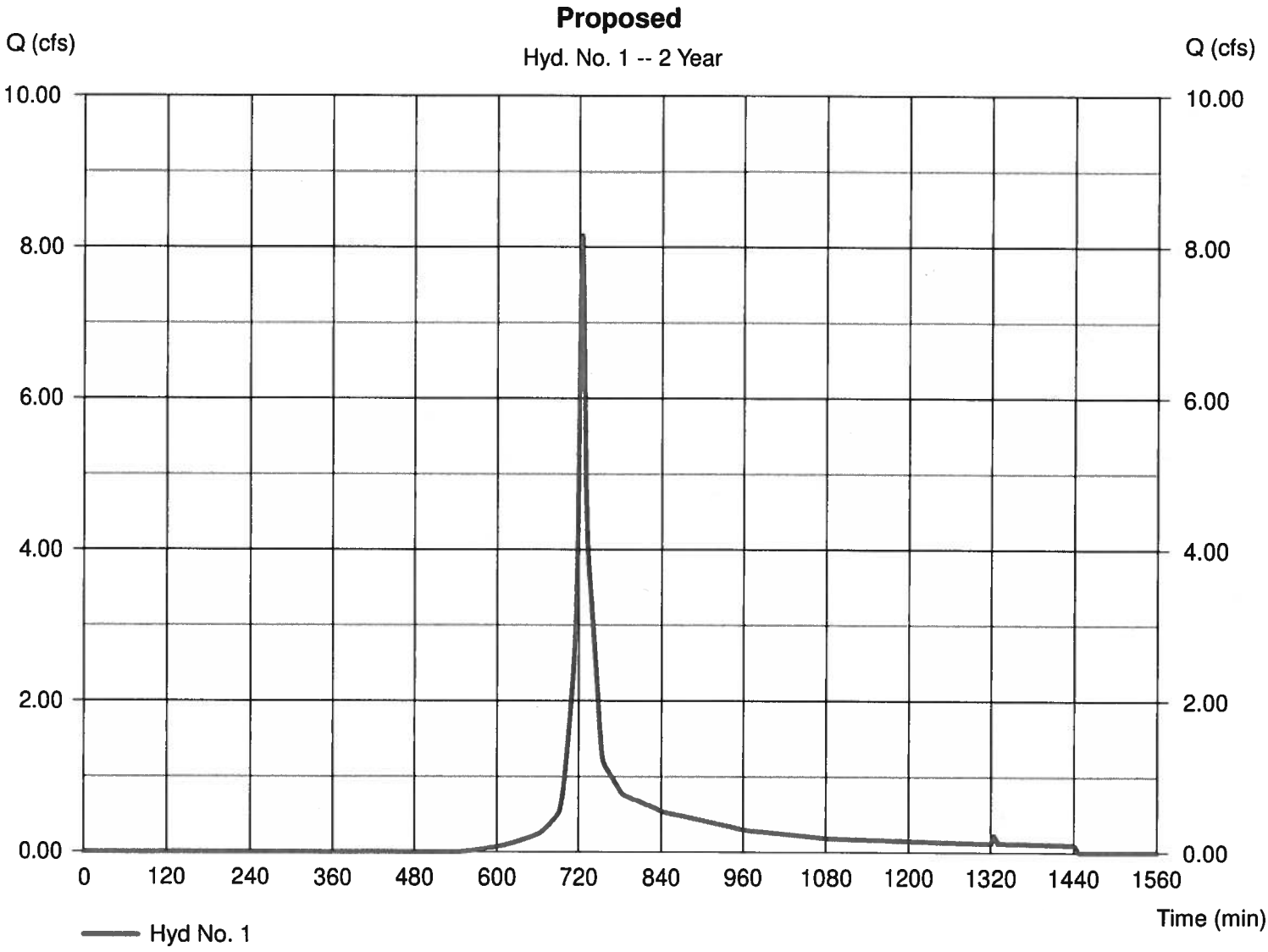
Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= 8.152 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 24,497 cuft
Drainage area	= 4.900 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.300 x 70) + (2.100 x 90) + (0.500 x 90)] / 4.900



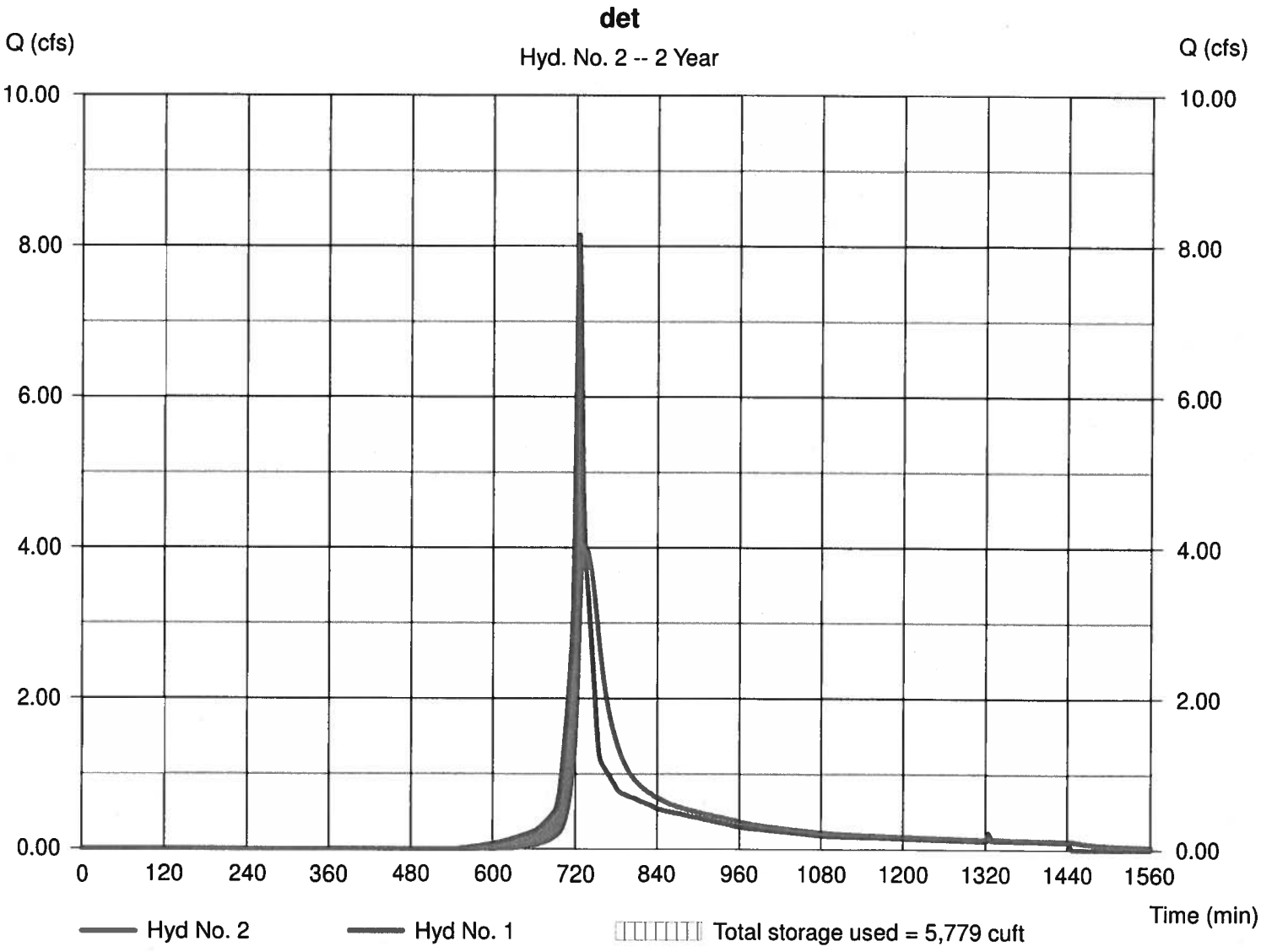
Hydrograph Report

Hyd. No. 2

det

Hydrograph type	= Reservoir	Peak discharge	= 4.021 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 24,476 cuft
Inflow hyd. No.	= 1 - Proposed	Max. Elevation	= 739.97 ft
Reservoir name	= <New Pond>	Max. Storage	= 5,779 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1

Wednesday, Sep 30, 2020

Pond No. 1 - <New Pond>

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 739.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	739.00	5,500	0	0
0.50	739.50	6,000	2,874	2,874
1.00	740.00	6,500	3,124	5,998
1.50	740.50	8,625	3,768	9,766
2.00	741.00	10,750	4,834	14,600
2.50	741.50	12,875	5,898	20,497
3.00	742.00	15,000	6,961	27,459
3.50	742.50	18,000	8,238	35,696
4.00	743.00	21,000	9,739	45,436

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 739.00	0.00	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

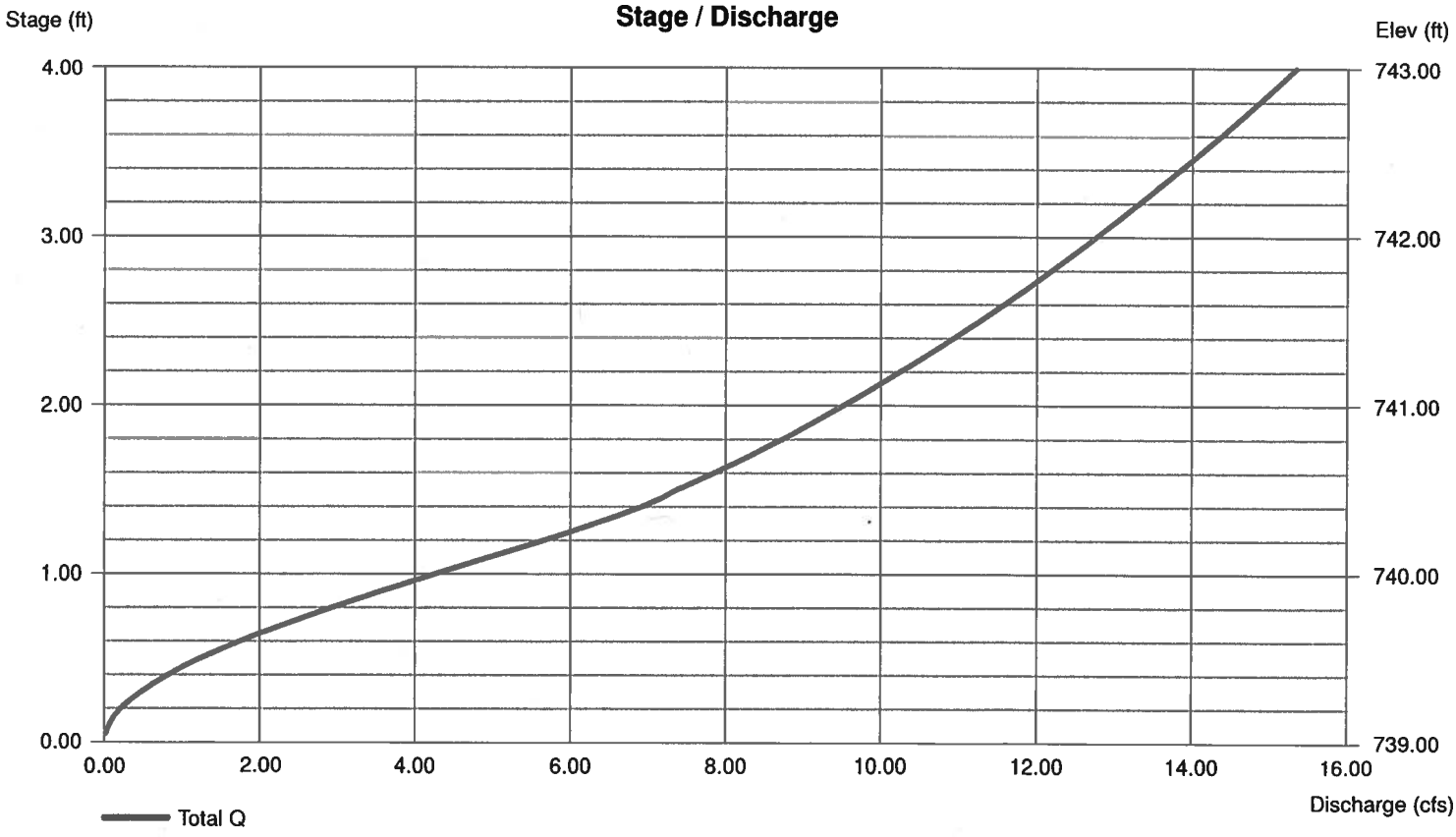
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



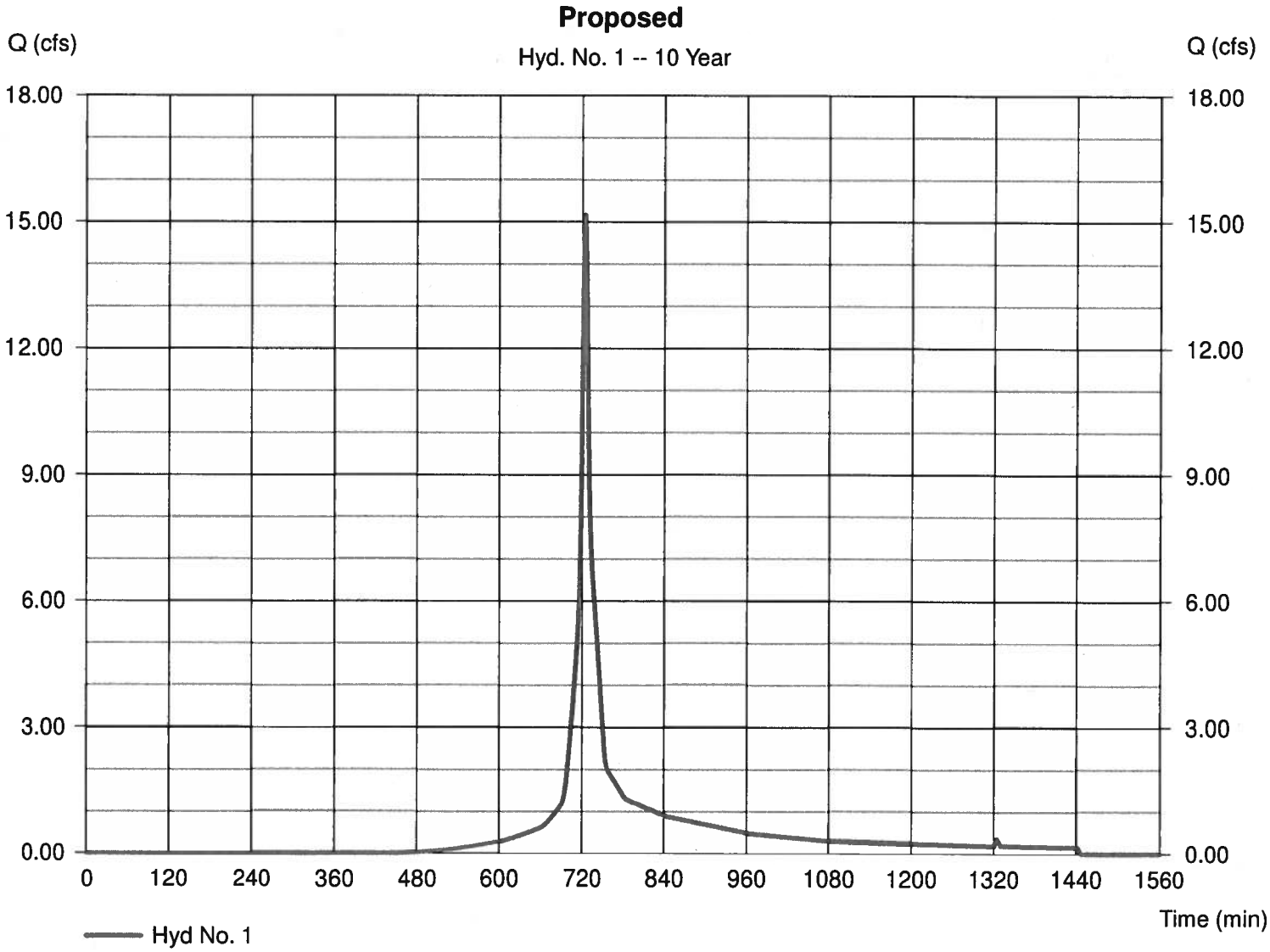
Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= 15.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 45,387 cuft
Drainage area	= 4.900 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.300 x 70) + (2.100 x 90) + (0.500 x 90)] / 4.900



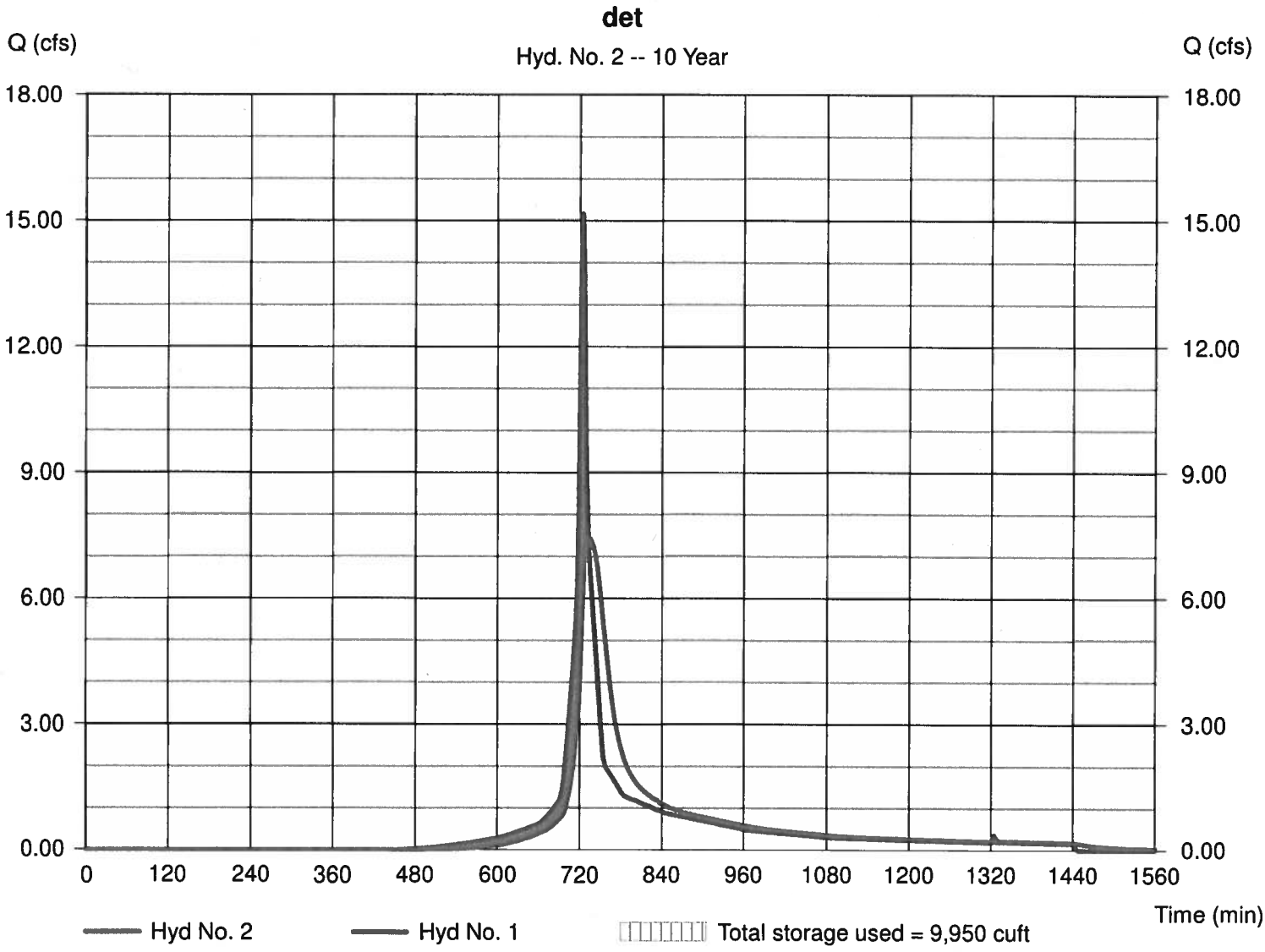
Hydrograph Report

Hyd. No. 2

det

Hydrograph type	= Reservoir	Peak discharge	= 7.460 cfs
Storm frequency	= 10 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 45,366 cuft
Inflow hyd. No.	= 1 - Proposed	Max. Elevation	= 740.52 ft
Reservoir name	= <New Pond>	Max. Storage	= 9,950 cuft

Storage Indication method used.



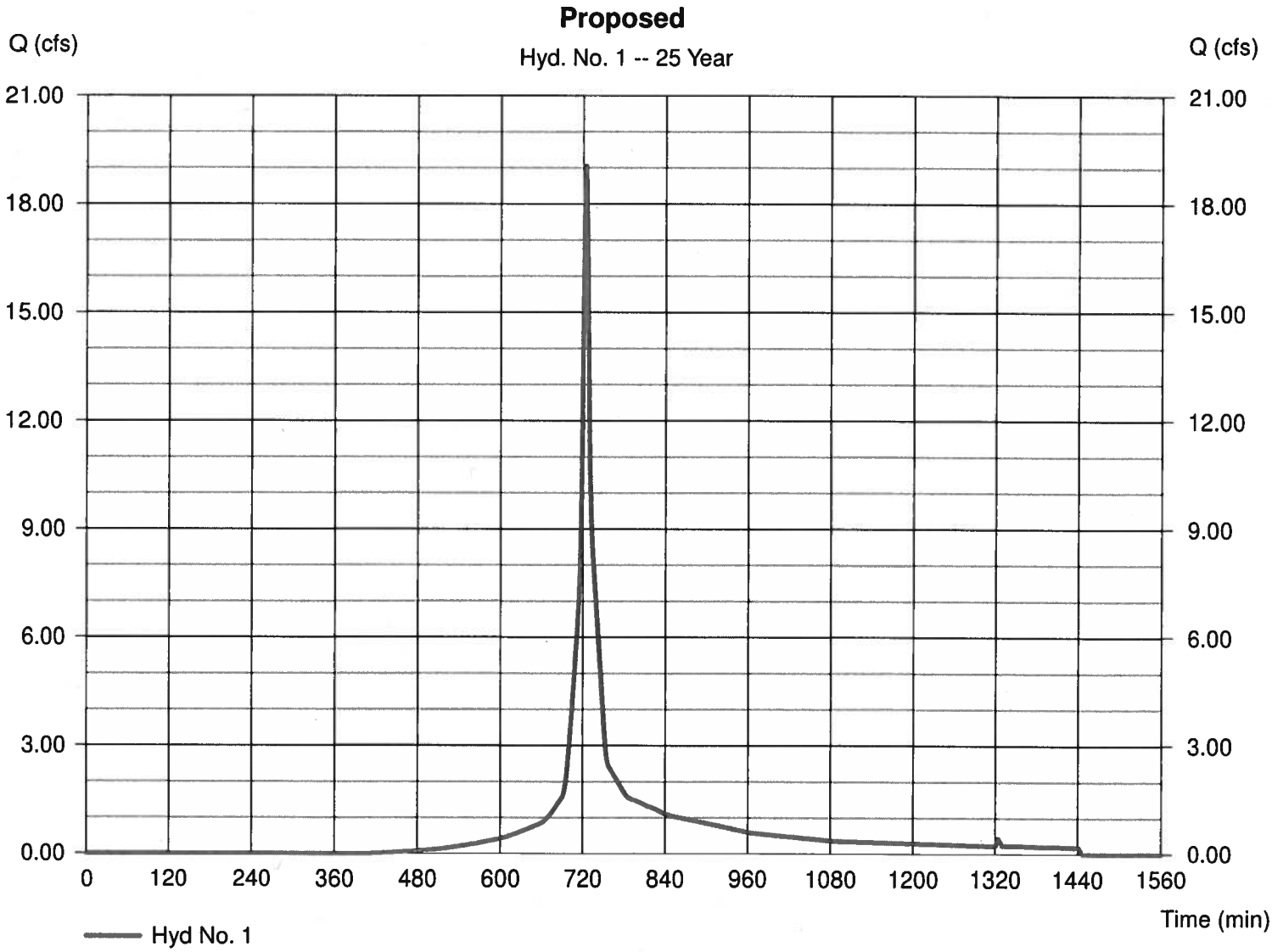
Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= 19.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 57,215 cuft
Drainage area	= 4.900 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.50 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.300 x 70) + (2.100 x 90) + (0.500 x 90)] / 4.900



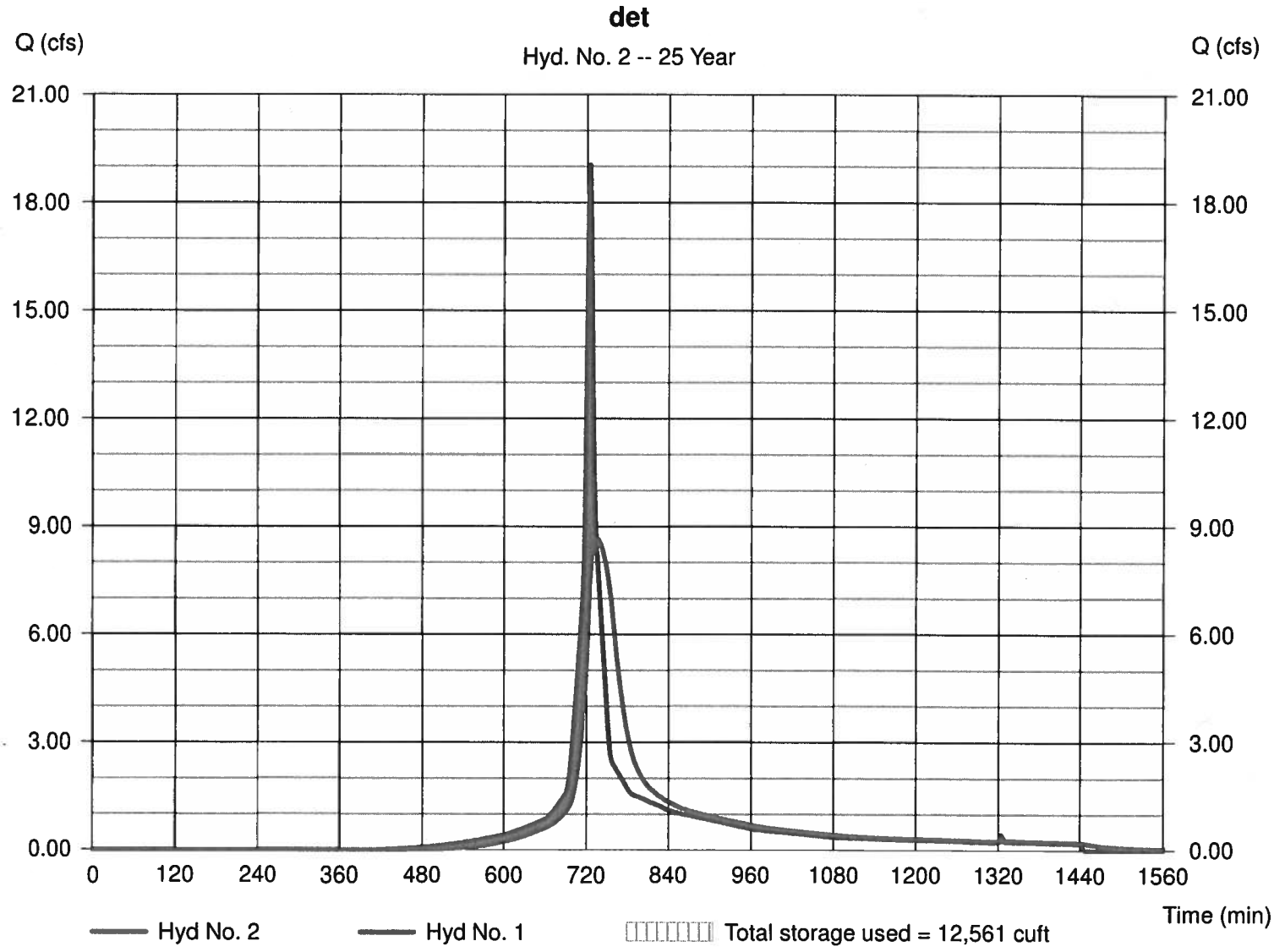
Hydrograph Report

Hyd. No. 2

det

Hydrograph type	= Reservoir	Peak discharge	= 8.672 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 57,194 cuft
Inflow hyd. No.	= 1 - Proposed	Max. Elevation	= 740.79 ft
Reservoir name	= <New Pond>	Max. Storage	= 12,561 cuft

Storage Indication method used.



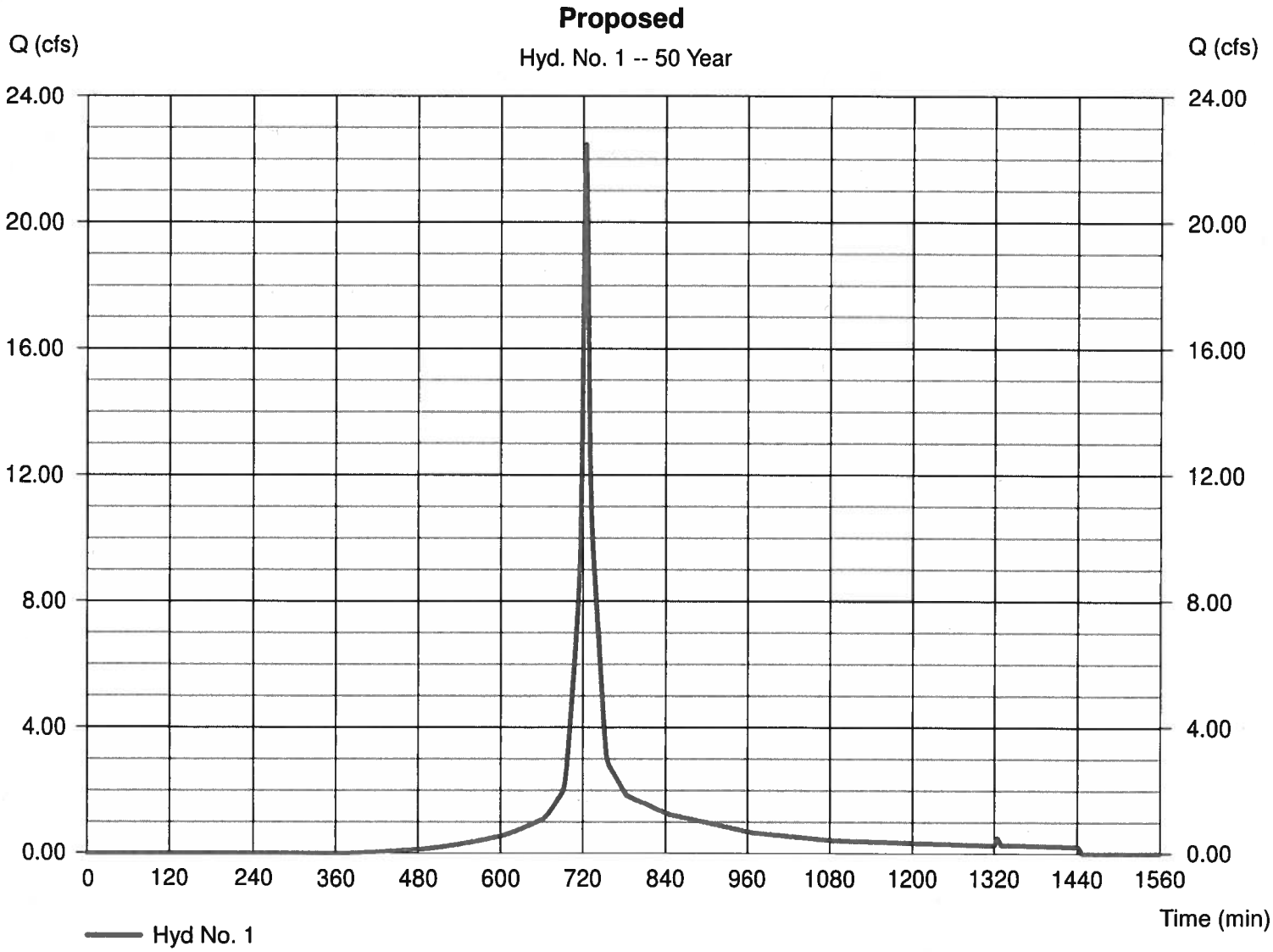
Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= 22.47 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 67,809 cuft
Drainage area	= 4.900 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.300 x 70) + (2.100 x 90) + (0.500 x 90)] / 4.900



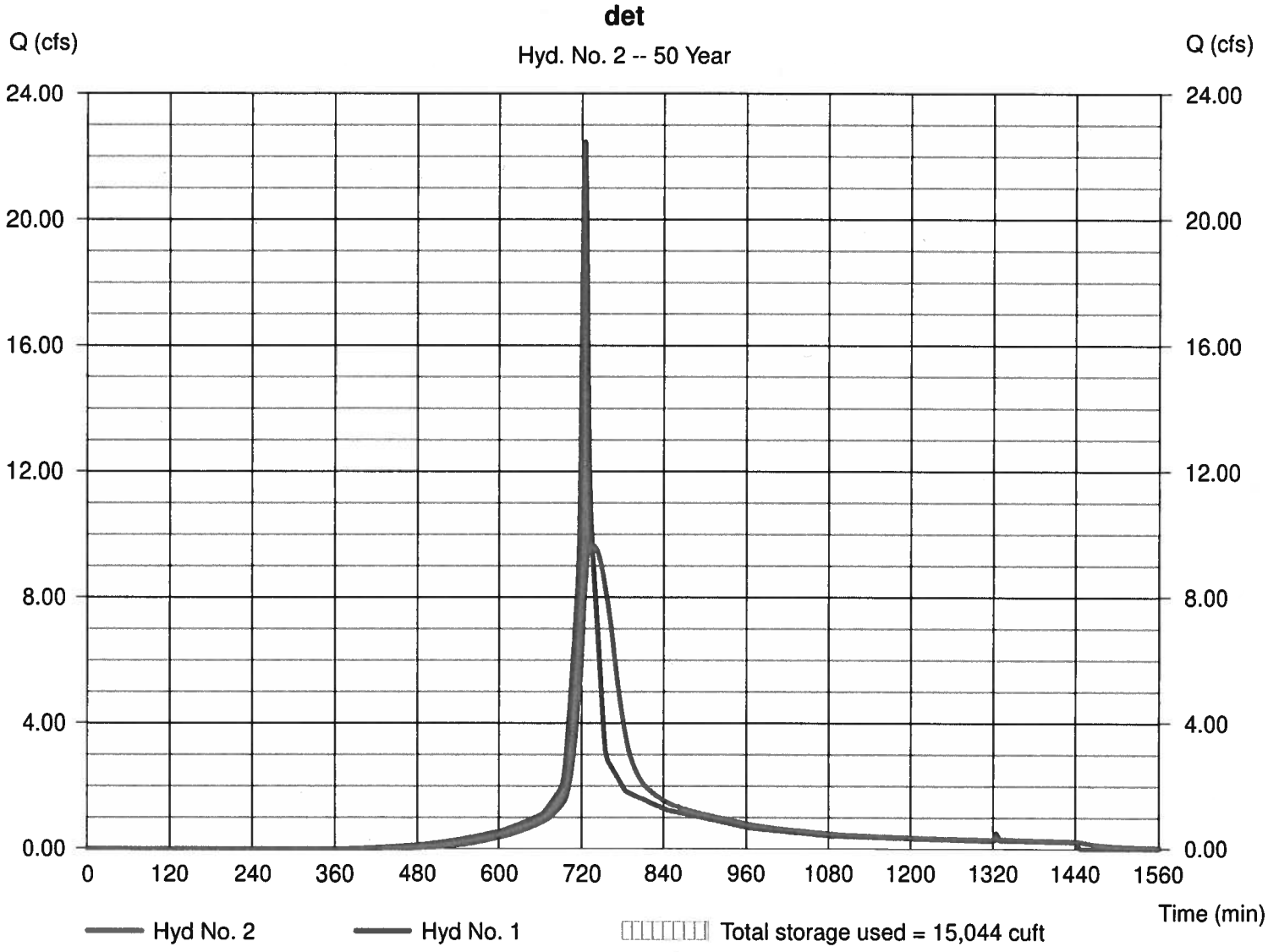
Hydrograph Report

Hyd. No. 2

det

Hydrograph type	= Reservoir	Peak discharge	= 9.654 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 67,788 cuft
Inflow hyd. No.	= 1 - Proposed	Max. Elevation	= 741.04 ft
Reservoir name	= <New Pond>	Max. Storage	= 15,044 cuft

Storage Indication method used.



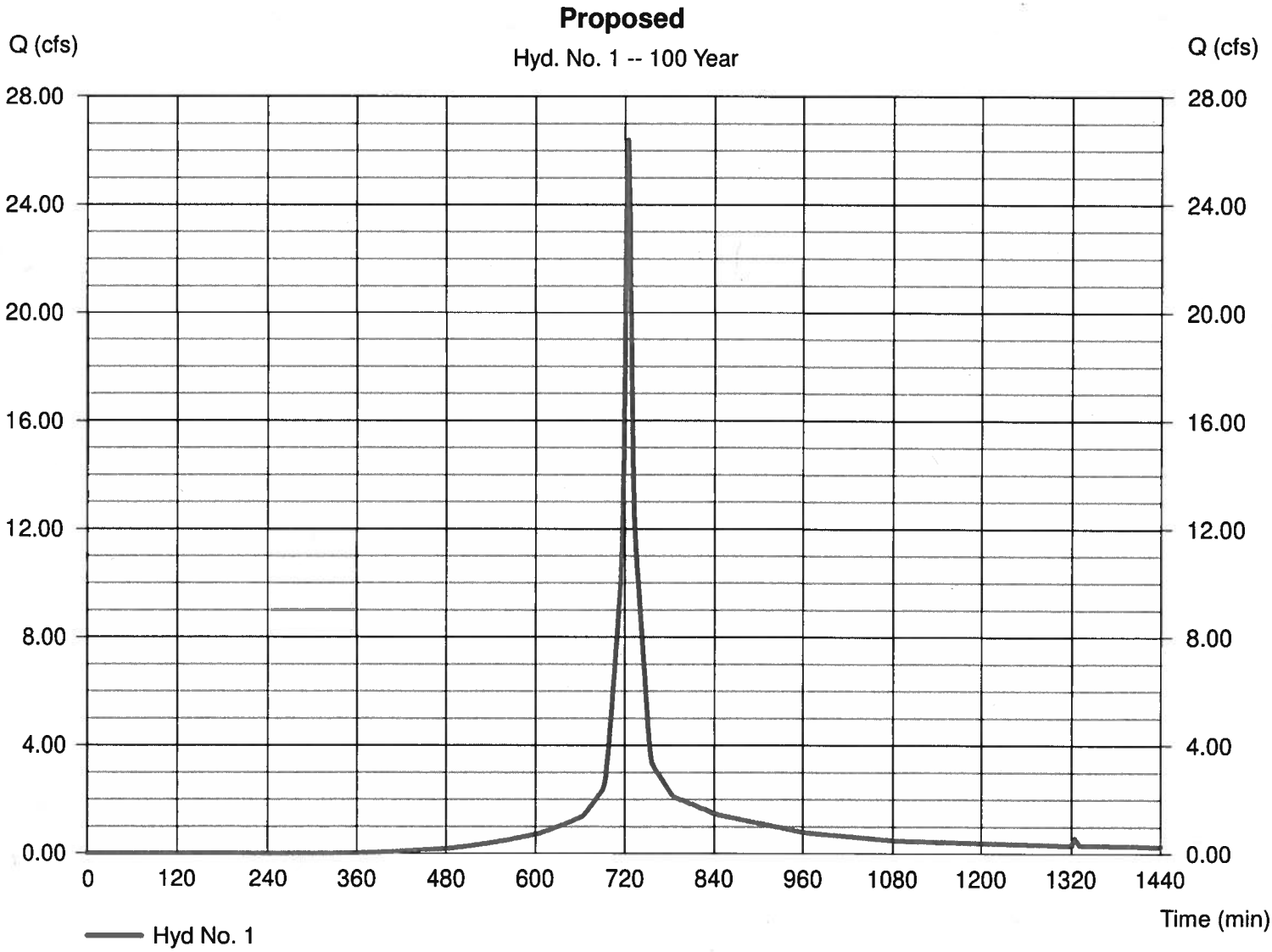
Hydrograph Report

Hyd. No. 1

Proposed

Hydrograph type	= SCS Runoff	Peak discharge	= 26.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 80,126 cuft
Drainage area	= 4.900 ac	Curve number	= 81*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(2.300 x 70) + (2.100 x 90) + (0.500 x 90)] / 4.900



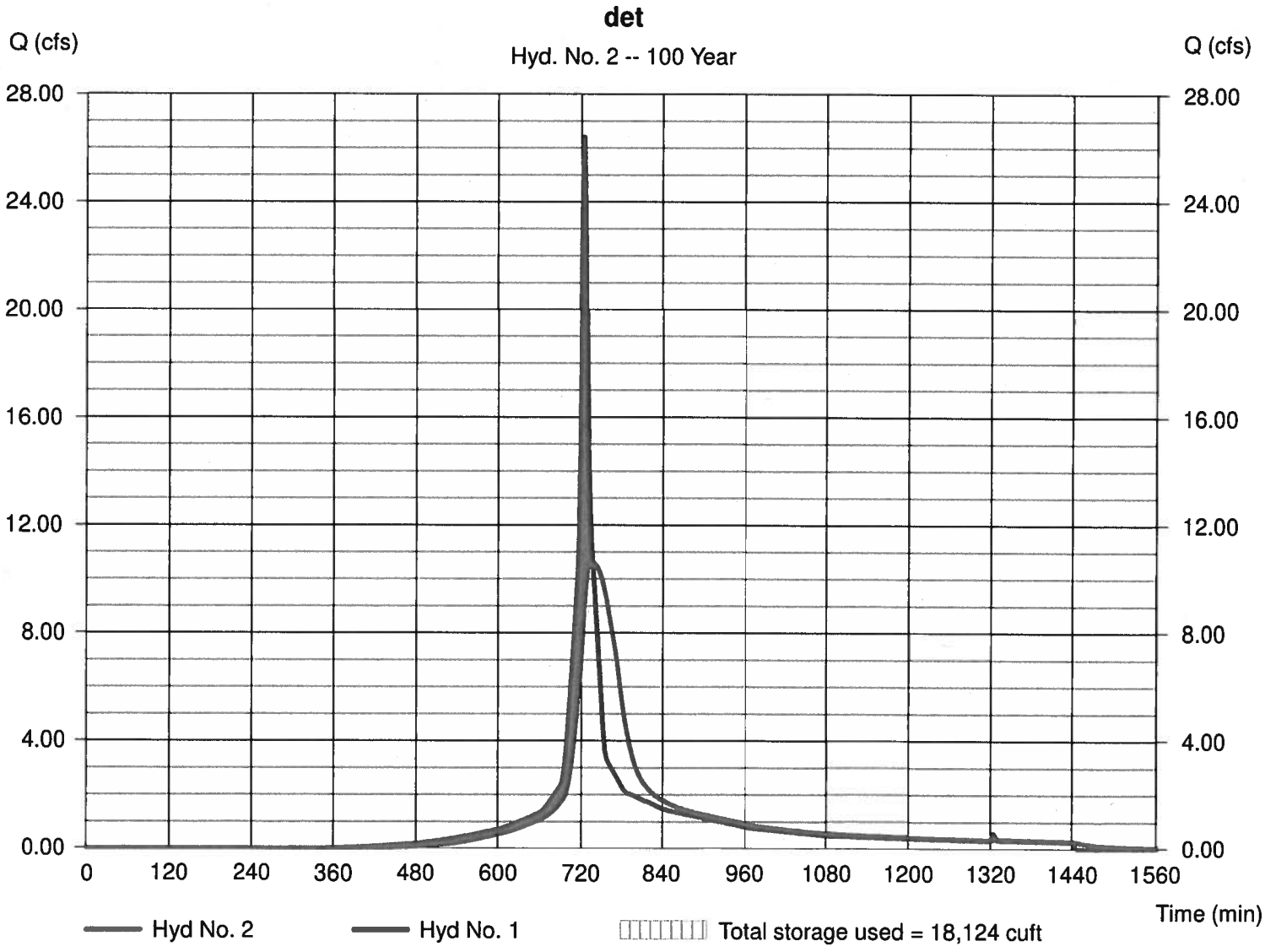
Hydrograph Report

Hyd. No. 2

det

Hydrograph type	= Reservoir	Peak discharge	= 10.59 cfs
Storm frequency	= 100 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 80,105 cuft
Inflow hyd. No.	= 1 - Proposed	Max. Elevation	= 741.30 ft
Reservoir name	= <New Pond>	Max. Storage	= 18,124 cuft

Storage Indication method used.



APPENDIX C: WATERSHED MAP